

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **TAUBER et. al**

5 : Parent Application Serial No.: **09/845,108**

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10 For: **RARE EARTH METAL COMPOUNDS FOR USE IN HIGH CRITICAL
TEMPERATURE THIN FILM STRUCTURES FOR SUPER-CONDUCTORS,
FERROELECTRICS, PYROELECTRICS, PIEZOELECTRICS, AND HYBRIDS**

PRELIMINARY AMENDMENT

AMENDMENTS TO THE CLAIMS

15

Sir:

In accordance with the enclosed Remarks and the Revised Amendment Format, please
amend the claims in the above-identified application as follows:

20

1. (Withdrawn) Dielectric substrates of the general formula Sr_2RESbO_6 where RE is a
rare earth metal selected from the group consisting of Lutetium, Ytterbium, Thulium, Erbium,
Holmium, Dysprosium, Yttrium, Lanthanum, Gadolinium, Samarium, Praseodymium,
Europium, Neodymium and Terbium.

25

2. (Withdrawn) The dielectric substrates, as recited in claim 1, further comprising:
said dielectric substrates being heated for at least 20 hours at between $1400^{\circ}C$ and 1600°
C;

said dielectric substrates having a low dielectric constant in the range of 4.1 to 16.3;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

30

\AA^3 ; and

said dielectric substrates having a low dielectric loss in the range of less than 1×10^{-3} to 9
 $\times 10^{-3}$ without a phase transition.

3. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{LuSbO}_6$.

5 4. (Withdrawn) The dielectric substrate, according to claim 3, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 15.1; and

said dielectric substrate having a low dielectric loss of less than 1×10^{-3} .

10 5. (Currently Amended) ~~A The dielectric substrate, according to claim 6, wherein of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Lutetium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{LuSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2~~

15 ~~\AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400° C and 1600 °~~

~~C;~~

~~said dielectric substrate is constructed in a thin film structure;~~

~~said dielectric substrate having a density GM/CC of 6.87-6.90;~~

20 ~~said dielectric substrate having a low dielectric constant between 14.3 and 15.9;~~

~~said dielectric substrate having an ordered perovskite cubic crystalline structure; and~~

~~said dielectric substrate having a low dielectric loss less than 1×10^{-3} without a phase transition.~~

25 6. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{YbSbO}_6$.

7. (Withdrawn) The dielectric substrate, according to claim 6, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 5.1; and
said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

8. (Currently Amended) ~~A The dielectric substrate, according to claim 6, wherein of the~~
5 ~~general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Ytterbium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{YbSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

10 ~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a thin film structure;~~

~~said dielectric substrate having a density GM/CC of 6.86 ~~5.87~~ ;~~

~~said dielectric substrate having a low dielectric constant between 4.8 and 5.4;~~

15 ~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

~~said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.~~

20 9. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{TmSbO}_6$.

10. (Withdrawn) The dielectric substrate, according to claim 9, wherein:

~~said dielectric substrate is constructed in a bulk form;~~

25 ~~said dielectric substrate having a low dielectric constant of 10.0; and~~

~~said dielectric substrate having a low dielectric loss of 2.0×10^{-3} .~~

11. (Currently Amended) ~~A The dielectric substrate, according to claim 9, wherein of~~
~~the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

said RE being Thulium;
said dielectric substrate being constructed of $\text{Sr}_2\text{TmSbO}_6$;
said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;

A^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

C ;

said dielectric substrate is constructed in a thin film structure;

said dielectric substrates having a density GM/CC of ~~6.77~~ 6.86;

said dielectric substrate having a low dielectric constant between 9.5 and 10.5;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said dielectric substrate having a low dielectric loss of 2.0×10^{-3} without a phase transition.

12. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{ErSbO}_6$.

13. (Withdrawn) The dielectric substrate, according to claim 12, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 5.3; and

said dielectric substrate having a low dielectric loss of 1.6×10^{-3} .

14. (Currently Amended) ~~A The dielectric substrate according to claim 12 wherein of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Erbium;

said dielectric substrate being constructed of $\text{Sr}_2\text{ErSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;

A^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

C;

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 6.77;

said dielectric substrate having a low dielectric constant of 4.1;

5 said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said dielectric substrate having a low dielectric loss of 3.2×10^{-3} without a phase transition.

10 15. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{HoSbO}_6$.

16. (Withdrawn) The dielectric substrate, according to claim 15, wherein:

said dielectric substrate is constructed in a bulk form;

15 said dielectric substrate having a low dielectric constant of 11.6; and

said dielectric substrate having a low dielectric loss of about 3.1×10^{-3} .

17. (Currently Amended) ~~A The dielectric substrate, according to claim 15, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

20 said RE being Holmium;

said dielectric substrate being constructed of $\text{Sr}_2\text{HoSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°

25 C;

said dielectric substrate is constructed in a thin film structure;

said dielectric substrates having a density GM/CC of 6.64;

said dielectric substrate having a low dielectric constant between 11.1 and 12.2;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline

structure; and

said dielectric substrate having a low dielectric loss of 3.1×10^{-3} without a phase transition.

5 18. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{DySbO}_6$.

19. (Withdrawn) The dielectric substrate, according to claim 18, wherein:

said dielectric substrate is constructed in a bulk form;

10 said dielectric substrate having a low dielectric constant of 11.2; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

20. (Currently Amended) ~~A The dielectric substrate, according to claim 18, wherein of~~
the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

15 said RE being Dysprosium;

said dielectric substrate being constructed of $\text{Sr}_2\text{DySbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;

20 said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of ~~6.56~~ 6.64;

said dielectric substrate having a low dielectric constant between 10.6 and 11.8;

25 said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.

21. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of

Sr₂TbSbO₆.

22. (Withdrawn) The dielectric substrate, according to claim 21, wherein:

said dielectric substrate is constructed in a bulk form;

5 said dielectric substrate having a low dielectric constant of 12.9; and

said dielectric substrate having a low dielectric loss of 1.4×10^{-3} .

23. (Currently Amended) ~~A The dielectric substrate, according to claim 21, wherein of~~
~~the general formula Sr₂RESbO₆, comprising:~~

10 ~~said RE being Terbium;~~

~~said dielectric substrate being constructed of Sr₂TbSbO₆;~~

~~said general formula including an Sb⁵⁺ constituent atom with a polarizability of about 1.2~~

~~Å³.~~

~~said dielectric substrate being heated for at least 20 hours at between 1400° C and 1600 °~~

15 ~~C;~~

~~said dielectric substrate is constructed in a thin film structure;~~

~~said dielectric substrates having a density GM/CC of 6.48;~~

~~said dielectric substrate having a low dielectric constant of 4.6;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline~~

20 ~~structure; and~~

~~said dielectric substrate having a low dielectric loss of 4.0×10^{-3} without a phase transition.~~

24. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of

25 Sr₂YSbO₆.

25. (Withdrawn) The dielectric substrate, according to claim 24, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 7.1; and

said dielectric substrate having a low dielectric loss of 1.4×10^{-3} .

26. (Currently Amended) ~~A The dielectric substrate, according to claim 24, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:~~

5 said RE being Yttrium;

 said dielectric substrate being constructed of Sr_2YSbO_6 ;

 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

\AA^3 .

 said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°

10 $^\circ\text{C}$;

 said dielectric substrate is constructed in a thin film structure;

 said dielectric substrate having a density GM/CC of ~~5.91~~ 6.56;

 said dielectric substrate having a low dielectric constant between 6.7 and 7.5;

 said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline

15 structure; and

 said dielectric substrate having a low dielectric loss of about 1.4×10^{-3} without a phase transition.

27. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of
20 $\text{Sr}_2\text{LaSbO}_6$.

28. (Withdrawn) The dielectric substrate, according to claim 27, wherein:

 said dielectric substrate is constructed in a bulk form;

 said dielectric substrate having a low dielectric constant of 16.3; and

25 said dielectric substrate having a low dielectric loss of 3.8×10^{-3} .

29. (Currently Amended) ~~A The dielectric substrate according to claim 27 wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

 said RE being Lanthanum;

said dielectric substrate being constructed of $\text{Sr}_2\text{LaSbO}_6$;
said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

\AA^3 .

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°

C ;

said dielectric substrate is constructed in a thin film structure;

said dielectric substrate having a density GM/CC of 5.19 – 5.91 ;

said dielectric substrate having a low dielectric constant between 14.5 and 16.1 ;

said dielectric substrate having an ordered perovskite cubic crystalline structure; and

said dielectric substrate having a low dielectric loss of about 3.8×10^{-3} without a phase transition.

30. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{GdSbO}_6$.

31. (Withdrawn) The dielectric substrate, according to claim 30, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 12.1 ; and

said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

32. (Currently Amended) ~~A The dielectric substrate, according to claim 30, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Gadolinium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{GdSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2~~
 ~~\AA^3 .~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°~~

~~C ;~~

~~said dielectric substrate is constructed in a thin film structure;~~

said dielectric substrate having a density GM/CC of 6.42;
said dielectric substrate having a low dielectric constant of 6.0;
said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline
structure; and

5 said dielectric substrate having a low dielectric loss of 9.0×10^{-3} without a phase
transition.

33. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of
 $\text{Sr}_2\text{SmSbO}_6$.

10 34. (Withdrawn) The dielectric substrate, according to claim 33, wherein:
 said dielectric substrate is constructed in a bulk form;
 said dielectric substrate having a low dielectric constant of 13.6; and
 said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

15 35. (Currently Amended) ~~A The dielectric substrate, according to claim 33, wherein of~~
~~the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Samarium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{SmSbO}_6$;~~

20 ~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2~~
 ~~\AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°~~
 ~~C ;~~

~~said dielectric substrate is constructed in a thin film structure;~~

25 ~~said dielectric substrate having a density GM/CC of 6.26;~~

~~said dielectric substrate having a low dielectric constant of 8.8;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline~~
~~structure; and~~

~~said dielectric substrate having a low dielectric loss of 9.0×10^{-3} without a phase~~

transition.

36. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{PrSbO}_6$.

37. (Withdrawn) The dielectric substrate, according to claim 36, wherein:

said dielectric substrate is constructed in a bulk form;

said dielectric substrate having a low dielectric constant of 10.9; and

said dielectric substrate having a low dielectric loss of 2.2×10^{-3} .

38. (Currently Amended) ~~A The dielectric substrate, according to claim 36, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Praseodymium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{PrSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a thin film structure;~~

~~said dielectric substrates having a density GM/CC of 6.02;~~

~~said dielectric substrate having a low dielectric constant between 10.4 and 11.4;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

~~said dielectric substrate having a low dielectric loss of about 2.2×10^{-3} without a phase transition.~~

39. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{EuSbO}_6$.

40. (Withdrawn) The dielectric substrate, according to claim 39, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 14.6; and
said dielectric substrate having a low dielectric loss of less than 1.0×10^{-3} .

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41. (Currently Amended) ~~A The dielectric substrate, according to claim 39, wherein of~~
~~the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Europium;~~

~~said dielectric substrate being constructed of $\text{Sr}_2\text{EuSbO}_6$;~~

10 ~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-30} ;~~

~~said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said dielectric substrate is constructed in a thin film structure;~~

15 ~~said dielectric substrate having a density GM/CC of 6.30;~~

~~said dielectric substrate having a low dielectric constant of 4.6;~~

~~said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

20 ~~said dielectric substrate having a low dielectric loss of 2.0×10^{-3} without a phase transition.~~

42. (Withdrawn) The dielectric substrate, according to claim 2, being constructed of $\text{Sr}_2\text{NdSbO}_6$.

25 43. (Withdrawn) The dielectric substrate, according to claim 42, wherein:
said dielectric substrate is constructed in a bulk form;
said dielectric substrate having a low dielectric constant of 10.6; and
said dielectric substrate having a low dielectric loss of 2.9×10^{-3} .

44. (Currently Amended) A ~~The dielectric substrate, according to claim 42, of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, further comprising:

said RE being Neodymium;

said dielectric substrate being constructed of $\text{Sr}_2\text{NdSbO}_6$;

5 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 .

said dielectric substrate being heated for at least 20 hours at between 1400°C and 1600°C ;

said dielectric substrate is constructed in a thin film structure;

10 said dielectric substrate having a density GM/CC of 6.13;

said dielectric substrate having a low dielectric constant between 10.1 and 11.1;

said dielectric substrate having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

15 said dielectric substrate having a low dielectric loss of about 2.9×10^{-3} without a phase transition.

45. (Withdrawn) A thin film high T_c structure, comprising:

a plurality of thin films constructed of a compound of the general formula $\text{Sr}_2\text{RESbO}_6$
wherein RE is a rare earth metal;

20 said plurality of thin films being interspersed with a plurality of layers constructed of a copper oxide superconductor;

said plurality of thin films being deposited by pulsed laser deposition and being heated for at least 20 hours at between 750°C to 825°C ;

said plurality of thin films having a low dielectric constant;

25 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

said plurality of thin films having a low dielectric loss without a phase transition.

46. (Withdrawn) A thin film high critical temperature superconductor structure,

according to claim 45, further comprising:

said plurality of thin films are constructed of $\text{Sr}_2\text{LuSbO}_6$;

said plurality of thin films being heated for at least 20 hours at between 750°C to 825°C ;

and

5 said plurality of layers are constructed of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$.

47. (Withdrawn) A thin film high critical temperature superconductor structure,
according to claim 45, further comprising:

said plurality of thin films are constructed of $\text{Sr}_2\text{LaSbO}_6$; and

10 said plurality of layers are constructed of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$.

48. (Withdrawn) An antenna, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate
of the formula $\text{Sr}_2\text{LuSbO}_6$;

15 said single crystal substrate having a low dielectric constant;

said single crystal substrate having a low dielectric loss without a phase transition;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

said single layer of a copper oxide superconductor being patterned to complete the device.

20 49. (Withdrawn) A superconductor insulator superconductor step edge Josephson
junction, comprising:

a single layer of a copper oxide superconductor deposited onto a single crystal substrate
of the formula $\text{Sr}_2\text{YbSbO}_6$;

said single crystal substrate having a low dielectric constant;

25 said single crystal substrate having a low dielectric loss without a phase transition;

said single layer of a copper oxide superconductor being patterned;

a second layer of $\text{Sr}_2\text{YbSbO}_6$ deposited onto said single layer of a copper oxide
superconductor;

said formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ; and

a second layer of a copper oxide superconductor deposited and patterned on said second layer of $\text{Sr}_2\text{YbSbO}_6$.

50-52. (Canceled)

53. (Currently Amended) ~~A The buffer layer according to claim 52, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Ytterbium;~~

~~said buffer layer being constructed of $\text{Sr}_2\text{YbSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said buffer layer is constructed in a thin film structure;~~

~~said buffer layer having a density GM/CC of $6.86-5.87$;~~

~~said buffer layer having a low dielectric constant between 4.8 and 5.4;~~

~~said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

~~said buffer layer having a low dielectric loss of less than to 1×10^{-3} without a phase transition.~~

54. (Canceled)

55. (Currently Amended) ~~A The buffer layer , according to claim 54, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Thulium;~~

~~said buffer layer being constructed of $\text{Sr}_2\text{TmSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} ;~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

said buffer layer is constructed in a thin film structure;
said buffer layer having a density GM/CC of ~~6.77-6.86~~;
said buffer layer having a low dielectric constant between 9.5 and 10.5;
said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline
5 structure;
said buffer layer having a low dielectric loss of about 2.0×10^{-3} without a phase
transition.

56. (Canceled)

10 57. (Currently Amended) ~~A The buffer layer , according to claim 56, wherein of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Erbium;

said buffer layer being constructed of $\text{Sr}_2\text{ErSbO}_6$;

15 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-24} ;

said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.77;

20 said buffer layer having a low dielectric constant of 4.1;

said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline
structure; and

said buffer layer having a low dielectric loss of 3.2×10^{-3} without a phase transition.

25 58. (Canceled)

59. (Currently Amended) ~~A The buffer layer , according to claim 58, wherein of the~~
general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Holmium;

said buffer layer being constructed of $\text{Sr}_2\text{HoSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} .

Δ^3 .

said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.64;

said buffer layer having a low dielectric constant between 11.1 and 12.2;

said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said buffer layer having a low dielectric loss of 3.1×10^{-3} without a phase transition.

60. (Canceled)

61. (Currently Amended) ~~A The buffer layer, according to claim 60, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

said RE being Dysprosium;

said buffer layer being constructed of $\text{Sr}_2\text{DySbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2×10^{-3} .

Δ^3 .

said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.56-6.64;

said buffer layer having a low dielectric constant between 10.6 and 11.8;

said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said buffer layer having a low dielectric loss of less than 1.0×10^{-3} without a phase transition.

62. (Canceled)

63. (Currently Amended) ~~A The buffer layer , according to claim 62, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Terbium;~~

~~said buffer layer being constructed of $\text{Sr}_2\text{TbSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said buffer layer is constructed in a thin film structure;~~

~~said buffer layer having a density GM/CC of 6.48;~~

~~said buffer layer having a low dielectric constant of 4.6;~~

~~said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

~~said buffer layer having a low dielectric loss of $1.4-4.0 \times 10^{-3}$ without a phase transition.~~

64. (Canceled)

65. (Currently Amended) ~~A The buffer layer according to claim 64, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Yttrium;~~

~~said buffer layer being constructed of Sr_2YSbO_6 ;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 ;~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said buffer layer is constructed in a thin film structure;~~

~~said buffer layer having a density GM/CC of 6.56;~~

~~said buffer layer having a low dielectric constant between 6.7 and 7.5;~~

~~said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and~~

said buffer layer having a low dielectric loss of about 1.4×10^{-3} without a phase transition.

66. (Canceled)

67. (Currently Amended) ~~A The buffer layer, according to claim 66, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Lanthanum;~~

~~said buffer layer being constructed of $\text{Sr}_2\text{LaSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 .~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said buffer layer is constructed in a thin film structure;~~

~~said buffer layer having a density GM/CC of 5.19-5.91;~~

~~said buffer layer having a low dielectric constant between 14.5 and 16.1;~~

~~said buffer layer having an ordered perovskite cubic crystalline structure; and~~

~~said buffer layer having a low dielectric loss of about 3.8×10^{-3} without a phase transition.~~

68. (Canceled)

69. (Currently Amended) ~~A The buffer layer, according to claim 68, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~

~~said RE being Gadolinium;~~

~~said buffer layer being constructed of $\text{Sr}_2\text{GdSbO}_6$;~~

~~said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2 \AA^3 .~~

~~said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;~~

~~said buffer layer is constructed in a thin film structure;~~

said buffer layer having a density GM/CC of 6.42;
said buffer layer having a low dielectric constant of 6.0;
said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline
structure; and

5 said buffer layer having a low dielectric loss of 9.0×10^{-3} without a phase transition.

70. (Canceled)

10 71. (Currently Amended) ~~A The buffer layer , according to claim 70, wherein of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~
 said RE being Samarium;
 said buffer layer being constructed of $\text{Sr}_2\text{SmSbO}_6$;
 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2
 \AA^3 .

15 said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;
 said buffer layer is constructed in a thin film structure;
 said buffer layer having a density GM/CC of 6.26;
 said buffer layer having a low dielectric constant of 8.8;
 said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline
20 structure; and
 said buffer layer having a low dielectric loss of 9.0×10^{-3} without a phase transition.

72. (Canceled)

25 73. (Currently Amended) ~~A The buffer layer , according to claim 72, wherein of the~~
~~general formula $\text{Sr}_2\text{RESbO}_6$, comprising:~~
 said RE being Praseodymium;
 said buffer layer being constructed of $\text{Sr}_2\text{PrSbO}_6$;
 said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

A³.

said buffer layer being heated for at least 20 hours at between 1400° C and 1600 ° C;

said buffer layer is constructed in a thin film structure;

said buffer layers having a density GM/CC of 6.02;

said buffer layer having a low dielectric constant between 10.4 and 11.4;

said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said buffer layer having a low dielectric loss of about 2.2×10^{-3} without a phase transition.

74. (Canceled)

75. (Currently Amended) A The buffer layer , according to claim 74, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Europium;

said buffer layer being constructed of $\text{Sr}_2\text{EuSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2.

A³.

said buffer layer being heated for at least 20 hours at between 1400° C and 1600 ° C;

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.30;

said buffer layer having a low dielectric constant of 4.6;

said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said buffer layer having a low dielectric loss of 2.0×10^{-3} without a phase transition.

76. (Canceled)

77. (Currently Amended) A The buffer layer , according to claim 76, wherein of the

general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Neodymium;

said buffer layer being constructed of $\text{Sr}_2\text{NdSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

5 \AA^3 ;

said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;

said buffer layer is constructed in a thin film structure;

said buffer layer having a density GM/CC of 6.13;

said buffer layer having a low dielectric constant between 10.1 and 11.1;

10 said buffer layer having an ordered perovskite pseudo-cubic tetragonal crystalline structure; and

said buffer layer having a low dielectric loss of about 2.9×10^{-3} without a phase transition.

15 78. (Canceled)

79. (Currently Amended) A The buffer layer, according to claim 78, wherein of the general formula $\text{Sr}_2\text{RESbO}_6$, comprising:

said RE being Lutetium;

20 said buffer layer being constructed of $\text{Sr}_2\text{LuSbO}_6$;

said general formula including an Sb^{5+} constituent atom with a polarizability of about 1.2

\AA^3 ;

said buffer layer being heated for at least 20 hours at between 1400°C and 1600°C ;

said buffer layer is constructed in a thin film structure;

25 said buffer layer having a density GM/CC of 6.87-6.90;

said buffer layer having a low dielectric constant between 14.3 and 15.9;

said buffer layer having an ordered perovskite cubic crystalline structure; and

said buffer layer having a low dielectric loss constant of less than 1×10^{-3} without a phase transition.